Bayesian Econometrics - Assignment 1

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Note

All programs used in this assignment are available on my github repository. Where possible, I have double-checked my answers in R, and these programs are up there too. Each section contains a link to the relevant program.

Question 1

Part a) i

The following pseudocode describes how to sample from a (lower) truncated normal distribution.

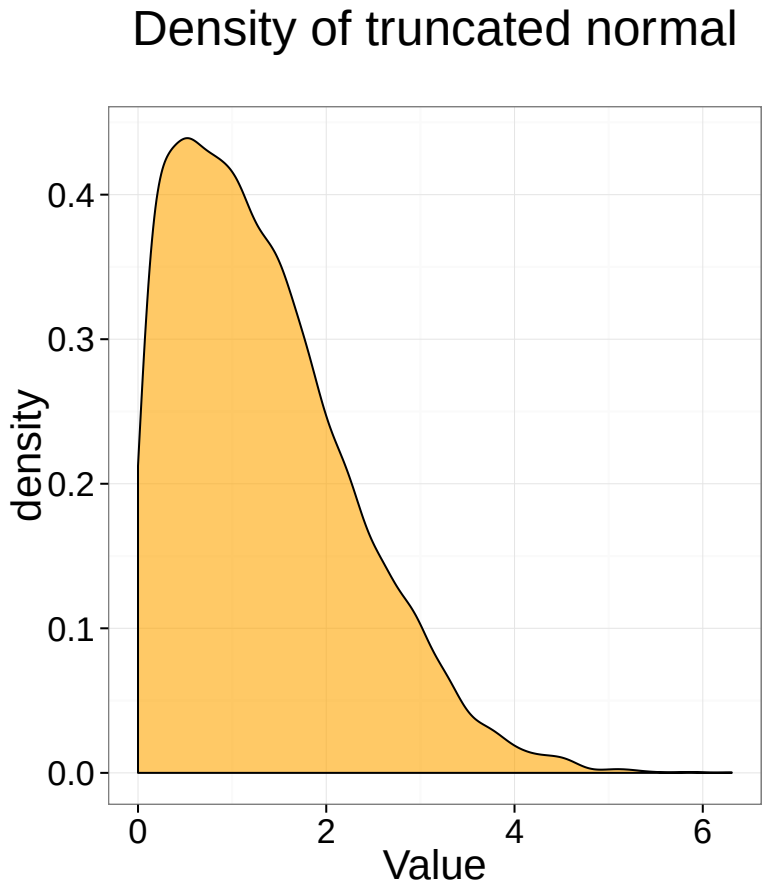
```
input: number of draws;
the mean of the un-truncated distribution;
the variance of the un-truncated distribution;
the truncation point


1. draw #of draws from (0,1) uniform distribution

2. for each draw, find the value of the inverse
    cdf of the target truncated normal
    distribution
```

Part a) ii

The function may be found here: `https://github.com/khakieconomics/homework/blob/master/Bayesian_econometrics/rnormtrunc.m`

Work for the rest of question 1 using the function can be found here: `https://github.com/khakieconomics/homework/blob/master/Bayesian_econometrics/question1.m`

Sense-checking using R can be found here: `https://github.com/khakieconomics/homework/blob/master/Bayesian_econometrics/Question_1.R`



Part b)

A KDE plot of the draws is given.

Part c) i

To find the probability that the parameter θ lies between 0 and 1, all we need to do is find the proportion of draws from the distribution that are between 0 and 1.

```
mean(draws>0 & draws<1)
```

Which gives us 0.419.

Part c) ii)

The 0.05 and 0.95 quantiles of the distribution are $[0.13, 3.12]$, which has a length of a little less than 3 (2.99).

Part d)

Given the distribution has a lot of mass at the truncation point, a 90 per cent credibility interval could probably contain that point. The $[0, 0.9]$ quantile interval, $[0, 2.65]$, is shorter, at only 2.65—a significant reduction.